

ON NUTRITION AND HEALTH

DR. RUDOLF STEINER

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Lecture I

Rudolf Steiner: Good morning, gentlemen! Has someone thought of a question during the last weeks?

Question: Sir, I would like to ask about various foods — beans and carrots, for instance: what effect they have on the body. You have already spoken about potatoes; perhaps we could hear something about other foodstuffs. Some vegetarians won't eat things that have hung in the air, like beans or peas. And when one looks at a field of grain, one wonders how the various grains differ — for apparently all the peoples of the earth cultivate some grain or other.

Dr. Steiner: So — the question is about the relation of various foods to the human body. Well, first of all we should gain a clear idea of nutrition itself. One's immediate thought of nutrition is that when we eat something, it goes through the mouth down into the stomach, then it is deposited farther in the body and finally we get rid of it; then we must eat again, and so on. But the process is not as simple as that. It is much more complicated. And if one wants to understand how the human being is really related to various foods, one must first be clear about the kinds of food one definitely needs.

Now the very first thing one needs, the substance one must have without fail, is protein. Let us write all this on the board, so that we have it complete. So, protein, as it is in a hen's

egg, for instance — but not just in eggs; protein is in all foods. One needs protein without fail. The second thing one needs is fats. These too are in all foods. Fats are even in plants. The third thing has a name that will be less familiar to you, but one needs to know it: carbohydrates. Carbohydrates are found particularly in potatoes, but they are also found in large quantity in all other plants. The important fact about carbohydrates is that when we eat them, they are slowly turned into starch by the saliva in our mouth and the secretions in our stomach. Starch is something we need without fail, but we don't eat starch; we eat foods that contain carbohydrates, and the carbohydrates are turned into starch inside us. Then they are converted once again, in the further process of digestion, into sugar. And we need sugar. So you see, we get the sugar we need from the carbohydrates. But we still need something else: minerals. We get them partly by adding them to our food, for example in the form of salt, and partly they are already contained in all our foodstuffs.

Now when we consider protein, we must realize how greatly it differs in animals and human beings from what it is in plants. Plants contain protein too, but they don't eat it, so where do they get it from? They get it out of the ground and out of the air, From the mineral world; they can take their protein from lifeless, mineral sources. Neither animal nor man can do that. A human being cannot use the protein that is to be got from lifeless elements — he would then only be a plant — he must

get his protein as it is already prepared in plants or animals.

Actually, to be able to live on this earth the human being needs the plants. But now this is the amazing fact: the plants could not live on the earth either if human beings were not here! So, gentlemen, we reach the interesting fact — and we must grasp it quite clearly: that of all things the two most essential for human life are the green sap in the green leaves and blood. The green in the sap of a plant is called chlorophyll. Chlorophyll is contained in the green leaf. And the one other essential thing is blood.

Now this brings us to something very remarkable. Think how you breathe: that is also a way of taking in nourishment. You take oxygen in from the air; you breathe it in. But there is carbon spread through your entire body. If you go down into the earth where there are coal deposits, you've got black coal. When you sharpen a pencil, you've got graphite. Coal and graphite: they're both carbon. Your whole body is made of carbon (as well as other substances). Carbon is formed in the human body. You could say, a man is just a heap of black coal! But you could also say some thing else. Because — remember the most expensive thing in the world? a diamond — and that's made of carbon; it just has a different form. And so, if you like the sound of it better, you could say you're made of glittering diamonds. The black carbon, that graphite in the pencil, and the diamonds: they are all the same

substance. If someday the coal that is dug out of the earth can by some process be made transparent, you'll have diamonds. So we have diamonds hidden in our body. Or we are a coal field! But now when oxygen combines with carbon in the blood, you have carbon dioxide. And you know carbon dioxide quite well: you only have to think of Seltzer water with the bubbles in it: they are the carbon dioxide. It is a gas. So one can have this picture: A human being inhales oxygen from the air, the oxygen spreads all through his blood; in his blood he has carbon, and he exhales carbon dioxide. You breathe oxygen in, you breathe carbon dioxide out.

In the course of the earth's evolution, gentlemen, which I have recently been describing to you, everything would long ago have been poisoned by the carbon dioxide coming from the human beings and animals. For this evolution has been going on for a long time. As you can see, since long, long ago there could have been no human kingdom or animal kingdom alive on the earth unless plants had had a very different character from those kingdoms. Plants do not take in oxygen: they take in the carbon dioxide that human beings and animals exhale. Plants are just as greedy for the carbon dioxide as human beings are for oxygen.

Now if we look at a plant [see drawing] — root, stem, leaves, blossoms: the plant absorbs carbon dioxide in every part of it. And now the carbon in the carbon dioxide is

deposited in the plant, and the oxygen is breathed out by the plant. Human beings and animals get it back again. Man gives carbon dioxide out and kills everything; the plant keeps back the carbon, releases the oxygen and brings everything to life again. And the plant could do nothing with the carbon dioxide if it did not have its green sap, the chlorophyll. This green sap of the plant, gentlemen, is a magician. It holds the carbon back inside the plant and lets the oxygen go free. Our blood combines oxygen with carbon; the green plant-sap separates the carbon again from the carbon dioxide and sets the oxygen free. Think what an excellent arrangement nature has made, that plants and animals and human beings should complement one another in this way! They complement one another perfectly.

But we must go on. The human being not only needs the oxygen that the plant gives him, but he needs the entire plant. With the exception of poisonous plants and certain plants which contain very little of these substances, the human being needs all plants not only for his breathing but also for food. And that brings us to another remarkable connection. A plant consists of root, if it is an annual plant (we won't consider the trees at this moment) — of root, leaf and stem, blossom and fruit. Now look at the root for a moment. It is in the earth. It contains many minerals, because minerals are in the earth and the root clings to the earth with its tiny fine rootlets, so it is constantly absorbing those minerals. So the root of the plant

has a special relation to the mineral realm of the earth.

And now look here, gentlemen! The part of the human being that is related to the whole earth is the head. Not the feet, but actually the head. When the human being starts to be an earth-man in the womb, he has at first almost nothing but a head. He begins with his head. His head takes the shape of the whole cosmos and the shape of the earth. And the head particularly needs minerals. For it is from the head that the forces go out that fill the human body with bones, for instance. Everything that makes a human being solid is the result of the way the head has been formed. While the head itself is still soft, as in the womb, it cannot form bones properly. But as it becomes harder and harder itself, it gives over to the body the forces by which both man and animal are able to form their solid parts, particularly their bones. You can see from this that we need roots. They are related to the earth and contain minerals. We need the minerals for bone-building. Bones consist of calcium carbonate, calcium phosphate; those are minerals. So you can see that the human being needs roots in order to strengthen his head.

And so, gentlemen, if — for instance — a child is becoming weak in his head — inattentive, hyperactive — he will usually have a corresponding symptom: worms in his intestines. Worms develop easily in the intestines if the head forces are too weak, because the head does not then work down

strongly enough into the rest of the body. Worms find no lodging in a human body if the head forces are working down strongly into the intestines. You can see how magnificently the human body is arranged! — everything is related. And if one's child has worms, one should realize the child has become weak in his head. Also — whoever wants to be a teacher has to know these things — if there are persons who at a later age are weak-minded, one can be sure they have had worms when they were young.

And so what must one do if one observes this in the child? The simplest remedy is to give him carrots to eat for a while — with his other food, of course; naturally, one couldn't just feed him on carrots alone. Carrots are the root of the plant. They grow down in the earth and have a large quantity of minerals. They have the forces of the earth in them, and when they are taken into the stomach, they are able to work up through the blood into the head. Only substances rich in minerals are able to reach the head. Substances rich in minerals, root substances, give strength to a human being by way of the head. That is extraordinarily important. It is through carrots that the uppermost parts of the head become strong — which is precisely what the human being needs in order to be inwardly firm and vigorous, not soft.

If you look at the carrot plant, you can't help seeing that its strength has gone particularly into the root. It is almost entirely

root. The only part of the plant one is interested in is the root. The rest of it, the green part, is of no importance, it just sits there up above. So the carrot is particularly good as a food substance to maintain the human head. And if sometimes you yourselves feel empty-headed, dull, can't think properly, then it's fine if you too will eat carrots for a while! Naturally, they will help children the most.

But now if we compare a potato to a carrot — well, first of all it looks quite different. Of course, the potato plant has a green part. And then it has the part we eat, what we call the tubers, deep down in the earth. Now if we would think superficially, we could say those tubers are the roots. But that is not correct; the tubers are not roots. If you look carefully down into the soil, you can see the real roots hanging on the tubers. The real roots are tiny rootlets, root hairs, that hang on the tubers. They fall away easily. When you gather up the potatoes, the hairs have already fallen away. Only in the first moment when you are lifting a potato loose from the soil, the hairs are still all over it. When we eat a potato, we are really eating a piece of swollen, enlarged stem. It only appears to be a root; in reality it is stem. The leaves are metamorphosed. The potato is something down there between the root and the stem. Therefore it does not have as much mineral content as the carrot; it is not as earthy. It grows in the earth, but it is not so strongly related to the earth. And it contains particularly carbohydrates; not so many minerals, but carbohydrates.

So now, gentlemen, you can say to yourselves: When I eat carrots, my body can really take it easy, for all it needs is saliva to soften the carrot. All it needs is saliva and stomach secretions, pepsin and so forth for all the important substance of the carrot to reach the head. We need minerals, and minerals are furnished by any kind of root, but in greatest amounts by such a root as the carrot.

But now, when we eat potatoes, first they go into the mouth and stomach. There the body has to exert strength to derive starch from them. Then the digestive process goes further in the intestines. In order that something can go into the blood and also reach the head, there must be more exertion still, because sugar has to be derived from the starch. Only then can it go to the head. So one has to use still greater forces. Now think of this, gentlemen: when I exert my strength upon some external thing, I become weak. This is really a secret of human physiology: that if I chop wood, if I use my external bodily strength, I become weak; but if I exert an inner strength, transforming carbohydrates into starch and starch into sugar, I become strong. Precisely through the fact that I permeate myself with sugar by eating potatoes, I become strong. When I use my strength externally, I become weak; if I use it internally, I become strong. So it is not a matter of simply filling oneself up with food, but of the food generating strength in our body.

And so one can say: food from roots — and all roots have the same effect as carrots although not to the same degree: they all work particularly on the head — so, food from roots gives the body what it needs for itself. Foods that lean toward the green of the plant and contain carbohydrates provide the body with strength it needs for work, for movement.

I have already spoken about the potato. While it requires a terribly large expenditure of strength, it leaves a man weak afterwards, and does not provide him with any continuing strength. But the principle I have just given you holds good even for the potato.

Now to the same extent that the potato is a rather poor foodstuff, all the grains — wheat, rye, and so on — are good foodstuffs. The grains also contain carbohydrates, and of such a nature that the human being forms starch and sugar in the healthiest possible way. Actually, the carbohydrates of the grains can make him stronger than he can make himself by any other means. Only think for a moment how strong people are who live on farms, simply through the fact that they eat large quantities of their own homemade bread which contains the grain from their fields! They only need to have healthy bodies to start with, then if they can digest the rather coarse bread, it is really the healthiest food for them. They must first have healthy bodies, but then they become quite especially strong through the process of making starch and sugar.

Now a question might be raised. You see, human beings have come in the course of their evolution — shall I say, quite of their own accord — to eating the grains differently from the way animals eat them. A horse eats his oats almost as they grow. Animals eat their kernels of grain raw, just as they come from the plant. The birds would have a hard time getting their seed if they had to depend upon someone cooking it for them first! But human beings have come of themselves to cooking the grains. And now, gentlemen, what happens when we cook the grain? Well, when we cook the grain, we don't eat it cold, we eat it warm. And it's a fact, that to digest our food we need inner warmth. Unless there is warmth we can't transform our carbohydrates into starch and the starch into sugar: that requires inner heat.

So if we first apply external heat to the foodstuffs, we help the body: it does not have to provide all the warmth itself. By being cooked first, the foods have already begun the fire process, the warmth process. That's the first result. The second is, that they have been entirely changed. Think what happens to the grain when I make flour into bread. It becomes something quite different. And how has it become different? Well, first I have ground the seeds. What does that mean? I have crushed them into tiny, tiny pieces. And you see. what I do there with the seeds, grinding them, making them fine, I'd otherwise have to do later within my own body! Everything I do externally, I'd otherwise have to do internally, inside my

body; so by doing those things, I relieve my body. And the same with the baking itself: all the things I do in cooking, I save my body from doing. I bring the foods to a condition in which my body can more easily digest them.

You have only to think of the difference if someone would eat raw potatoes instead of cooked ones. If someone were to eat his potatoes raw, his stomach would have to provide a tremendous amount of warmth to transform those raw potatoes — which are almost starch already. And the extent to which it could transform them would not be sufficient. So then the potatoes would reach the intestines and the intestines would also have to use a great amount of energy. Then the potatoes would just stay put in the intestines, for the subsequent forces would not be able to carry them farther into the body. So if one eats raw potatoes, either one just loads one's stomach with them and the intestines can't even get started on them, or one fills up the intestines; in either case there is no further digestion. But if the potatoes undergo a preparatory stage through cooking or some other means, then the stomach does not have so much to do, or the intestines either, and the potatoes go over properly into the blood and right up into the head. So you see, by cooking our foods, especially those that are counted among the carbohydrates, we are able to help our nutrition.

You are certainly acquainted with all the new kinds of

foolishness in connection with nutrition — for instance, the raw food faddists, who are not going to cook anything anymore, they're going to eat everything raw. How does this come about? It's because people no longer know what's what from a materialistic science, and they shy away from a spiritual science, so they think a few things out on their own. The whole raw food fad is a fantasy. For a time someone living on raw food can whip the body along — in this situation the body has to be using very strong forces, so it has to be whipped — but then it will collapse all the more completely.

But now, gentlemen, let us come to the fats. Plants, almost all of them, contain fats which they derive from the minerals. Now fats do not enter the human body so easily as carbohydrates and minerals. Minerals are not even changed. For example, when you shake salt into your soup, that salt goes almost unchanged up into your head. You get it as salt in your head. But when you eat potatoes, you don't get potatoes in your head, you get sugar. The conversion takes place as I described to you. With the fats, however, whether they're plant fats or animal fats, it's not such a simple matter. When fats are eaten, they are almost entirely eaten up by the saliva, by the gastric secretions, by the intestinal secretions, and they become something quite different that then goes over into the blood. The animal and the human being must form their own fats in their intestines and in their blood, with forces which the fats they eat call forth.

You see, that is the difference between fats and sugar or minerals. The human being still takes his salt and his sugar from nature. He has to derive the sugar from the potato and the rye and so on, but there is still something of nature in it. But with the fats that man or animal have in them, there is nothing anymore of nature. They have formed them themselves. The human being would have no strength if he did not eat; his intestines and blood need fats. So we can say: Man himself cannot form minerals. If he did not take in minerals, his body would never be able to build them by itself. If he did not take in carbohydrates, if he did not eat bread or something similar from which he gets carbohydrates, he would never be able to form sugar by himself. And if he could not form sugar, he would be a weakling forever. So be grateful for the sugar, gentlemen! Because you are chock-full of sweetness, you have strength. The moment you would no longer be full to the brim with your own sweetness, you would have no strength, you would collapse.

And you know, that holds good even in connection with the various peoples. There are certain peoples who consume very little sugar or foodstuffs that produce sugar. These peoples have weak physical forces. Then there are certain peoples who eat many carbohydrates that form sugar, and they are strong.

But the human being doesn't have it so easy with the fats. If

someone has fats in him (and this is true also of the animals), that is his own accomplishment, the accomplishment of his body. Fats are entirely his own production. The human being destroys whatever fats he takes in, plant fats or animal fats, and through their destruction he develops strength. With potatoes, rye, wheat, he develops strength by converting the substances. With the fats that he eats, he develops strength by destroying the substances.

If I destroy something outside of myself, I become tired and exhausted. And if I have had a big fat beefsteak and destroy that inside myself, I become weak in the same way; but my destruction of the fat beefsteak or of the plant fat gives me strength again, so that I can produce my own fat if my body is predisposed to it. So you see, the consumption of fat works very differently in the human body from the consumption of carbohydrates. The human body, gentlemen, is exceedingly complicated, and what I have been describing to you is tremendous work. Much must take place in the human body for it to be able to destroy those plant fats.

But now let us think how it is when someone eats green stuff, the stems and leaves of a plant. When he eats green stuff he is getting fats from the plants. Why is it that sometimes a stem is so hard? Because it then gives its forces to leaves that are going to be rich in carbohydrates. And if the leaves stay green — the greener they are, the more fats they

have in them. So when someone eats bread, for instance, he can't take in many fats from the bread. He takes in more, for example, from watercress — that tiny plant with the very tiny leaves — more fats than when he eats bread. That's how the custom came about of putting butter on our bread, some kind of fat. It wasn't lust for the taste. And why country people want bacon with their bread. There again is fat, and that also is eaten for two reasons.

When I eat bread, the bread works upon my head because the root elements of a plant work up into the stem. The stem, even though it is stem and grows above the ground in the air, still has root forces in it. The question is not whether something is above in the air, but whether it has any root forces. Now the leaf, the green leaf, does not have root forces. No green leaf ever appears down in the earth. In late summer and autumn, when the sun forces are no longer working so strongly, the stem can mature. But the leaf needs the strongest sun forces for it to unfold; it grows toward the sun. So we can say, the green part of the plant works particularly on heart and lungs, while the root strengthens the head. The potato also is able to work into the head. When we eat greens, they give us particularly plant fats; they strengthen our heart and lungs, the middle man, the chest man.

That, I would say, is the secret of human nutrition: that if I want to work upon my head, I have roots or stems for dinner.

If I want to work upon my heart or my lungs, I make myself a green salad. And in this case, because these substances are destroyed in the intestines and only their forces proceed to work, cooking is not so necessary. That's why leaves can be eaten raw as salad. Whatever is to work on the head cannot be eaten raw; it must be cooked. Cooked foods work particularly on the head. Lettuce and similar things work particularly on heart and lungs, building them up, nourishing them through the fats.

But now, gentlemen, the human being must not only nurture the head and the middle body, the breast region, but he must nurture the digestive organs themselves. He needs a stomach, intestines, kidneys, and a liver, and he must build up these digestive organs himself. Now the interesting fact is this: to build up his digestive organs he needs protein for food, the protein that is in plants, particularly as contained in their blossoms, and most particularly in their fruit. So we can say: the root nourishes the head particularly [see drawing above]; the middle of the plant, stem and leaves, nourishes the chest particularly; and fruit nourishes the lower body.

When we look out at our grain fields we can say, Good that they are there! for that nourishes our head. When we look down at the lettuce we've planted, all those leaves that we eat without cooking because they are easily digested in the intestines — and it's their forces that we want — there we get

everything that maintains our chest organs. But cast an eye up at the plum and apples, at the fruits growing on the trees — ah! those we don't have to bother to cook much, for they've been cooked by the sun itself during the whole summer! There an inner ripening has already been happening, so that they are something quite different from the roots, or from stalks and stems (which are not ripened but actually dried up by the sun). The fruits, as I said, we don't have to cook much — unless we have a weak organism, in which case the intestines cannot destroy the fruits. Then we must cook them; we must have stewed fruit and the like. If someone has intestinal illnesses, he must be careful to take his fruit in some cooked form — sauce, jam, and so forth. If one has a perfectly healthy digestive system, a perfectly healthy intestinal system, then fruits are the right thing to nourish the lower body, through the protein they contain. Protein from any of the fruits nourishes your stomach for you, nourishes all your digestive organs in your lower body.

You can see what a good instinct human beings have had for these things! Naturally, they have not known in concepts all that I've been telling you, but they have known it instinctively. They have always prepared a mixed diet of roots, greens and fruit; they have eaten all of them, and even the comparative amounts that one should have of these three different foods have been properly determined by their instinct.

But now, as you know, people not only eat plants, they eat animals too, the flesh of animals, animal fat and so on.

Certainly it is not for anthroposophy ever to assume a fanatical or a sectarian attitude. Its task is only to tell how things are. One simply cannot say that people should eat only plants, or that they should also eat animals, and so on. One can only say that some people with the forces they have from heredity are simply not strong enough to perform within their bodies all the work necessary to destroy plant fats, to destroy them so completely that then forces will develop in their bodies for producing their own fat. You see, a person who eats only plant fats — well, either he's renounced the idea of becoming an imposing, portly fellow, or else he must have an awfully good digestive system, so healthy that it is easy for him to destroy the plant fats and in this way get forces to build his own fat. Most people are really unable to produce their own fat if they have only plant fats to destroy. When one eats animal fat in meat, that is not entirely destroyed. Plant fats don't go out beyond the intestines, they are destroyed in the intestines. But the fat contained in meat does go beyond, it goes over into the human being. And the person may be weaker than if he were on a diet of just plant fats.

Therefore, we must distinguish between two kinds of bodies. First there are the bodies that do not like fat, they don't enjoy eating bacon, they just don't like to eat fatty foods.

Those are bodies that destroy plant fats comparatively easily and want in that way to form their own fat. They say: "Whatever fat I carry around, I want to make myself; I want my very own fat." But if someone heaps his table with fatty foods, then he's not saying, "I want to make my own fat"; he's saying, "The world has to give me my fat." For animal fat goes over into the body, making the work of nutrition easier.

When a child sucks a candy, he's not doing that for nourishment. There is, to be sure, something nutritious in it, but the child doesn't suck it for that; he sucks it for the sweet taste. The sweetness is the object of his consciousness. But if an adult eats beef fat, or pork fat, or the like, well, that goes over into his body. It satisfies his craving just as the candy satisfies the child's craving. But it is not quite the same, for the adult feels this craving inside him. The adult needs this inner craving in order to respond to his inner being. That is why he loves meat. He eats it because his body loves it.

But it is no use being fanatic about these things. There are people who simply cannot live if they don't have meat. A person must consider carefully whether he really will be able to get on without it. If he does decide he can do without it and changes over from a meat to a vegetarian diet, he will feel stronger than he was before. That's sometimes a difficulty, obviously: some people can't bear the thought of living without meat. If, however, one does become a vegetarian, he feels

stronger — because he is no longer obliged to deposit alien fat in his body; he makes his own fat, and this makes him feel stronger.

I know this from my own experience. I could not otherwise have endured the strenuous exertion of these last twenty-four years! I never could have traveled entire nights, for instance, and then given a lecture the next morning. For it is a fact, that if one is a vegetarian one carries out a certain activity within one that is spared the non-vegetarian, who has it done first by an animal. That's the important difference.

But now don't get the idea that I would ever agitate for vegetarianism! It must always be first established whether a person is able to become a vegetarian or not; it is an individual matter.

You see, this is especially important in connection with protein. One can digest protein if one is able to eat plant protein and break it down in the intestines. And then one gets the forces from it. But the moment the intestines are weak, one must get the protein externally, which means one must eat the right kind of protein, which will be animal protein. Hens that lay eggs are also animals! So protein is something that is really judged quite falsely unless it is considered from an anthroposophical point of view.

When I eat roots, their minerals go up into my head. When I

eat salad greens, their forces go to my chest, lungs, and heart — not their fats, but the forces from their fats. When I eat fruit, the protein from the fruit stays in the intestines. And the protein from animal substances goes beyond the intestines into the body; animal protein spreads out. One might think, therefore, that if a person eats plenty of protein, he will be a well-nourished individual. This has led to the fact in this materialistic age that people who had studied medicine were recommending excessive amounts of protein for the average diet: they maintained that one hundred and twenty to one hundred and fifty grams of protein were necessary — which was ridiculous. Today it is known that only a quarter of that amount is necessary. And actually, if a person does eat such enormous and unnecessary amounts of protein — well, then something happens as it once did with a certain professor and his assistant.

They had a man suffering from malnutrition and they wanted to build him up with protein. Now it is generally recognized that when someone is consuming large amounts of protein — it is, of course, converted in him — his urine will show that he has had it in his diet. So now it happened with these two that the man's urine showed no sign of the protein being present in his body. It didn't occur to them that it had already passed through the intestines. The professor was in a terrible state. And the assistant was shaking in his boots as he said timidly: "Sir — Professor — perhaps — through the

intestines?” Of course!

What had happened? They had stuffed the man with protein and it was of no use to him, for it had gone from the stomach into the intestines and then out behind. It had not spread into the body at all. If one gulps down too much protein, it doesn't go over into the body at all, but into the fecal waste matter. Even so, the body does get something from it: before it passes out, it lies there in the intestines and becomes poisonous and poisons the whole body. That's what can happen from too much protein. And from this poisoning comes then very frequently arteriosclerosis — so that many people get arteriosclerosis too early, simply from stuffing themselves with too much protein.

It is important, as I have tried to show you, to know these things about nutrition. For most people are thoroughly convinced that the more they eat, the better they are nourished. Of course it is not true. One is often much better nourished if one eats less, because then one does not poison oneself.

The point is really that one must know how the various substances work. One must know that minerals work particularly on the head; carbohydrates — just as they are to be found in our most common foods, bread and potatoes, for instance — work more on the lung system and throat system

(lungs, throat, palate and so on). Fats work particularly on heart and blood vessels, arteries and veins, and protein particularly on the abdominal organs. The head has no special amount of protein. What protein it does have — naturally, it also has to be nourished with protein, for after all, it consists of living substances — that protein man has to form himself. And if one over-eats, it's no use believing that in that way one is getting a healthy brain, for just the opposite is happening: one is getting a poisoned brain.

Protein:	abdominal organs
Fats:	heart and blood vessels
Carbohydrates:	lungs, throat, palate
Minerals:	head

Perhaps we should devote another session to nutrition! That would be good, because these questions are very important. So then, Saturday at nine o'clock.

Lecture II

Rudolf Steiner: Today I would like to add a little more in answer to Herr Burle's question last Thursday. You remember that I spoke of the four substances necessary to human nutrition: minerals, carbohydrates, which are to be found in potatoes, but especially in our held grains and legumes, then fats, and protein. I pointed out how different our nutrition is with regard to protein as compared, for instance, to salt. A

man takes salt into his body and it travels all the way to his head, in such a way that the salt remains salt. It is really not changed except that it is dissolved. It keeps its forces as salt all the way to the human head. In contrast to this, protein — the protein in ordinary hens' eggs, for instance, but also the protein from plants — this protein is at once broken down in the human body, while it is still in the stomach and intestines; it does not remain protein. The human being possesses forces by which he is able to break down this protein. He also has the forces to build something up again, to make his own protein. He would not be able to do this if he had not already broken down other protein.

Now think how it is, gentlemen, with this protein. Imagine that you have become an exceptionally clever person, so clever that you are confident you can make a watch. But you've never seen a watch except from the outside, so you cannot right off make a watch. But if you take a chance and you take some watch to pieces, take it all apart and lay out the single pieces in such a way that you observe just how the parts relate to one another, then you know how you are going to put them all together again. That's what the human body does with protein. It must take in protein and take it all apart.

Protein consists of carbon, nitrogen, oxygen, hydrogen and sulphur. Those are its most important components. And now the protein is completely separated into its parts, so that when

it all reaches the intestines, man does not have protein in him, but he has carbon, nitrogen, oxygen, hydrogen, and sulphur. You see how it is? — now the man has the protein all laid out in its parts as you had the watch all laid out on the table. So now you will say, Sure! when I took that watch apart, I observed it very carefully, and now I can make watches. Likewise I only need to eat protein once; after that, I can make it myself. But it doesn't happen that way, gentlemen. A human being has his memory as a complete human entity; his body by itself does not have the kind of memory that can take note of something, it uses its “memory” forces just for building itself up. So one must always be eating new protein in order to be able to make a protein.

The fact is, the human being is involved in a very, very complicated activity when he manufactures his own protein. First he divides the protein he has eaten into its separate parts and puts the carbon from it into his body everywhere. Now you already know that we inhale oxygen from the air and that this oxygen combines with the carbon we have in us from proteins and other food elements. And we exhale carbon in carbon dioxide, keeping a part of it back. So now we have that carbon and oxygen together in our body. We do not retain and use the oxygen that was in the protein; we use the oxygen we have inhaled to combine with the carbon. Thus we do not make our own protein as the materialists describe it: namely, that we eat a great many eggs which then are deposited

throughout our body so that eggs we have eaten are spread over our whole body. That is not true.

Actually, we are saved by the organization of our body so that when we eat eggs, we don't all turn into crazy hens! It's a fact. We don't become crazy hens because we break the protein down in our intestines and instead of using the oxygen that was in the protein, we use oxygen coming out of the air. Also, as we breathe oxygen in we breathe nitrogen in too; nitrogen is always in the air. Again, we don't use the nitrogen that comes to us in the hens' eggs; we use the nitrogen we breathe in from the air. And the hydrogen we've eaten in eggs, we don't use that either, not at all. We use the hydrogen we take in through our nose and our ears, through all our senses; that's the hydrogen we use to make our protein. Sulphur too — we receive that continually from the air. Hydrogen and sulphur we get from the air. From the protein we eat, we keep and use only the carbon. The other substances, we take from the air. So you see how it is with protein.

There is a similar situation with fat. We make our own protein, using only the carbon from the external protein. And we also make our own fat. For the fats too, we use very little nitrogen from our food. So you see, we produce our own protein and fat. Only what we consume in potatoes, legumes, and grains goes over into our body. In fact, even these things

do not go fully into our body, but only to the lower part of our head. The minerals we consume go up into the entire head; from them we have what we need to build up our bones.

Therefore you see, gentlemen, we must take care to bring healthy plain protein into our body. Healthy plant protein! That is what our body needs in large quantity. When we take in protein from eggs, our body can be rather lazy; it can easily break the protein down, because that protein is easily broken down. But plant protein, which we get from fruit — it is chiefly in that part of the plant, as I told you on Thursday — that is especially valuable to us. If a person wants to keep himself healthy, it is really necessary to include fruit in his diet. Cooked or raw, but fruit he must have. If he neglects to eat fruit, he will gradually condemn his body to a very sluggish digestion.

You can see that it is also a question of giving proper nourishment to the plants themselves. And that means, we must realize that plants are living things; they are not minerals, they are something alive. A plant comes to us out of the seed we put in the ground. The plant cannot flourish unless the soil itself is to some degree alive. And how do we make the soil alive? By manuring it properly. Yes, proper manuring is what will give us really good plant protein.

We must remember that for long, long ages men have

known that the right manure is what comes out of the horses' stalls, out of the cow-barn and so on; the right manure is what comes off the farm itself. In recent times when everything has become materialistic, people have been saying: Look here! we can do it much more easily by finding out what substances are in the manure and then taking them out of the mineral kingdom: mineral fertilizer!

And you can see, gentlemen, when one uses mineral fertilizer, it is as if one just put minerals into the ground; then only the root becomes strong. Then we get from the plants the substance that helps to build up our bones. But we don't get a proper protein from the plants. And the plants, our field grains have suffered from the lack of protein for a long time. And the lack will become greater and greater unless people return to proper manuring.

There have already been agricultural conferences in which the farmers have said: Yes, the fruit gets worse and worse! And it is true. But naturally the farmers haven't known the reason. Every older person knows that when he was a young fellow, everything that came out of the fields was really better. It's no use thinking that one can make fertilizer simply by combining substances that are present in cow manure. One must see clearly that cow manure does not come out of a chemist's laboratory but out of a laboratory that is far more scientific — it comes from the far, far more scientific

laboratory inside the cow. And for this reason cow manure is the stuff that not only makes the roots of plants strong, but that works up powerfully into the fruits and produces good, proper protein in the plants which makes man vigorous.

If there is to be nothing but the mineral fertilizer that has now become so popular, or just nitrogen from the air — well, gentlemen, your children, more particularly, your grandchildren will have very pale faces. You will no longer see a difference between their faces and their white hands. Human beings have a lively, healthy color when the farmlands are properly manured.

So you see, when one speaks of nutrition one has to consider how the foodstuffs are being obtained. It is tremendously important. You can see from various circumstances that the human body itself craves what it needs. Here's just one example: people who are in jail for years at a stretch, usually get food that contains very little fat, so they develop an enormous craving for fat; and when sometimes a drop of wax falls on the floor from the candle that the guard carries into a cell, the prisoner jumps down at once to lick up the fat. The human body feels the lack so strongly if it is missing some necessary substance. We don't notice this if we eat properly and regularly from day to day; then it never happens that our body is missing some essential element. But if something is lacking in the diet steadily for

weeks, then the body becomes exceedingly hungry. That is also something that must be carefully noticed.

I have already pointed out that many other things are connected with fertilizing. For instance, our European forefathers in the twelfth and thirteenth centuries, or still earlier, were different from ourselves in many ways. One doesn't usually pay any attention to that fact. Among other things, they had no potatoes! Potatoes were not introduced until later. The potato diet has exercised a strong influence. When grains are eaten, the heart and lungs become particularly strong. Grains strengthen heart and lungs. A man then develops a healthy chest and he is in fine health. He is not so keen on thinking as on breathing, perhaps; but he can endure very much when he has good breathing. And let me say right here: don't think that someone has strong lungs if he's always opening the window and crying, "Let's get some fresh air in here!" No! a person has strong lungs if he is so conditioned that he can endure any kind of air. The toughened-up person is not the one who can't bear anything but the one who can!

In these days there is much talk about being hardy. Think how the children are "hardened"! Nowadays (in wealthy homes, of course, but then other people quickly follow suit) the children are dressed — well, when we were children, we wore long breeches and were well covered — at the most, we

went barefoot — now, the clothes only go down to the knee or are still shorter. If parents knew that this is the best preparation for later attacks of appendicitis, they would be more thoughtful. But fashion is a tyrant! — no thought is given to the matter, and the children are dressed so that their little dresses only reach to the knee, or less. Someday they will only reach to the stomach — that will be the fashion! Fashion has a strong influence.

But what is really at stake? People pay no attention to it. It is this: A human being is constituted throughout his organism so that he is truly capable of doing inner work on all the food he consumes. And in this connection it is especially important to know that a man becomes strong when he works properly on the foods he eats. Children are not made stronger by the treatment I have just mentioned. They are so “hardened” that later in their life — just watch them! — when they have to cross an empty square with the hot sun beating down on them, they drip with perspiration and they can't make it. Someone has not become toughened up when he is not able to stand anything; the person who can endure all possible hardships is the one who has been toughened up. So, in earlier days people were not toughened up; yet they had healthy lungs, healthy hearts, and so on.

And then came the potato diet! The potato takes little care of lung and heart. It reaches the head, but only, as I said, the

lower head, not the upper head. It does go into the lower head, where one thinks and exercises critical faculties. Therefore, you can see, in earlier times there were fewer journalists. There was no printing industry yet. Think of the amount of thought expended daily in this world in our time, just to bring the newspapers out! All that thinking, it is much too much, it is not at all necessary — and we have to thank the potato diet for that! Because a person who eats potatoes is constantly stimulated to think. He can't do anything but think. That's why his lungs and his heart become weak. Tuberculosis, lung tuberculosis, did not become widespread until the potato diet was introduced. And the weakest human beings are those living in regions where almost nothing else is grown but potatoes, where the people live on potatoes.

It is spiritual science that is able to know these material facts. (I have said this often.) Materialistic science knows nothing about nutrition; it has no idea what is healthy food for humanity. That is precisely the characteristic of materialism, that it thinks and thinks and thinks — and knows nothing. The truth is finally this: that if one really wants to participate in life, above all one has to know something! Those are the things I wanted to say about nutrition.

And now perhaps you may still like to ask some individual questions?

Question: Dr. Steiner, in your last talk you mentioned arteriosclerosis. It is generally thought that this illness comes from eating a great deal of meat and eggs and the like. I know someone in whom the illness began when he was fifty; he had become quite stiff by the time he was seventy. But now he is eighty-five or eighty-six, and he is much more active than he was in his fifties and sixties. Has the arteriosclerosis receded! Is that possible? Or is there some other reason, Perhaps I should mention that this person has never smoked and has drunk very little alcohol; he has lived a really decent life. But in his earlier years he did eat rather a lot of meat. At seventy he could do very little work, but now at eighty-five he is continually active.

Dr. Steiner: So — I understand you to say that this person became afflicted with arteriosclerosis when he was fifty, that he became stiff and could do very little work. You did not say whether his memory deteriorated; perhaps you did not notice. His condition continued into his seventies; then he became active again, and he is still living. Does he still have any symptom of his earlier arteriosclerosis or is he completely mobile and active?

Questioner: Today he is completely active and more mobile than when he was sixty-five or seventy. He is my father.

Dr. Steiner: Well, first of all we should establish the exact

nature of his earlier arteriosclerosis. Usually arteriosclerosis takes hold of a person in such a way that his arteries in general become sclerotic. Now if a man's arteries in general are sclerotic, he naturally becomes unable to control his body with his soul and spirit, and the body becomes rigid. Now it can also happen that someone has arteriosclerosis but not in his whole body; the disease, for instance, could have spared his brain. Then the following is the case. You see, I am somewhat acquainted with your own condition of health. I don't know your father, but perhaps we can discover something about your father's health from your own. For instance, you suffer somewhat, or have suffered (I hope it will be completely cured), from hay fever. That means that you carry in you something that the body can develop only if there is no tendency to arteriosclerosis in the head, but only outside the head. No one who is predisposed to arteriosclerosis in his entire body can possibly suffer an attack of hay fever. For hay fever is the exact opposite of arteriosclerosis. Now you suffer from hay fever. That shows that your hay fever — of course it is not pleasant to have hay fever, it's much better to have it cured; but we are talking of the tendency to have it — your hay fever is a kind of safety valve against arteriosclerosis.

But everyone gets arteriosclerosis to a small degree. One can't grow old without having it. If one gets it in the entire body, that's different: then one can't help oneself, one becomes rigid through one's whole body. But if one gets

arteriosclerosis in the head and not in the rest of the body, then — well, if one is growing old properly, the etheric body is growing stronger and stronger (I've spoken of this before), and it no longer has such great need of the brain, and so the brain can now become old and stiff. The etheric body can control this slight sclerotic condition — which in earlier years made one old and stiff altogether; now the etheric body can control it very cleverly so that it is no longer so severe.

Your father, for example, does not need to have had hay fever himself; he can just have had the tendency to it. And you see, just this tendency to it has been of benefit to him. One can even say — it may seem a little farfetched, but a person who has a tendency to hay fever can even say, Thank God I have this tendency! The hay fever isn't bothering me now, and it gives me permanently the predisposition to a softening of the vessels. Even if the hay fever doesn't come out, it is protecting him from arteriosclerosis. And if he has a son, the son can have the hay fever externally. A son can suffer externally from some disease that in the father was pushed inward.

Indeed, that is one of the secrets of heredity: that many things become diseases in the descendants which in the forefathers were aspects of health. Diseases are classified as arteriosclerosis, tuberculosis, cirrhosis, dyspepsia, and so forth. This can be written up very attractively in a book; one

can describe just how these illnesses progress. But one hasn't obtained much from it, for the simple reason that arteriosclerosis, for instance, is different in every single person. No two persons have arteriosclerosis alike; everyone becomes afflicted in a different way. That is really so, gentlemen. And it shouldn't surprise anyone.

There were two professors at Berlin University. One was seventy years old, the other ninety-two. The younger one was quite well-known; he had written many books. But he was a man who lived with his philosophy entirely within materialism; he only had thoughts that were stuck deep in materialism. Now such thoughts also contribute to arteriosclerosis. And he got arteriosclerosis. When he reached seventy, he was obliged to retire. The colleague who was over ninety was not a materialist; he had stayed a child through most of his life, and was still teaching with tremendous liveliness. He said, "Yes, that colleague of mine, that young boy! I don't understand him. I don't want to retire yet, I still feel so young." The other one, the "boy," was disrobed, could no longer teach. Of course the ninety-two-year-old had also become sclerotic with his years, his arteries were completely sclerotic, but because of his mobility of soul he could still do something with those arteries. The other man had no such possibility.

And now something more in answer to Herr Burle's question about carrots. Herr Burle said, "The human body

craves instinctively what it needs. Children often take a carrot up in their hands. Children, grownups too, are sometimes forced to eat food that is not good for them. I think this is a mistake when someone has a loathing for some food. I have a boy who won't eat potatoes.”

Gentlemen, you need only think of this one thing: if animals did not have an instinct for what was good for them, and what was bad for them, they would all long since have perished. For animals in a pasture come upon poisonous plants too — all of them — and if they did not know instinctively that they could not eat poisonous plants, they would certainly eat them. But they always pass them by.

But there is something more. Animals choose with care what is good for them. Have you sometimes fattened geese, crammed them with food? Do you think the geese would ever do that themselves? It is only humans who force the geese to eat so much. With pigs it is different; but how thin do you think our pigs might be if we did not encourage them to eat so much? In any case, with pigs it is a little different. They have acquired their characteristics through inheritance; their ancestors had to become accustomed to all the foods that produce fat. These things were taken up in their food in earlier times. But the primeval pigs had to be forced to eat it! No animal ever eats of its own accord what is not right for it.

But now, gentlemen, what has materialism brought about? It no longer believes in such an instinct.

I had a friend in my youth with whom I ate meals very often. We were fairly sensible about our food and would order what we were in the habit of thinking was good for us. Later, as it happens in life, we lost track of each other, and after some years I came to the city where he was living, and was invited to have dinner with him. And what did I see? Scales beside his plate! I said, “What are you doing with those scales?” I knew, of course, but I wanted to hear what he would say. He said, “I weigh the meat they bring me, to eat the right amount — the salad too.” There he was, weighing everything he should put on his plate, because science told him to. And what had happened to him? He had weaned himself completely from a healthy instinct for what he should eat and finally no longer knew! And you remember? — it used to be in the book: “a person needs from one hundred and twenty to one hundred and fifty grams of protein”; that, he had conscientiously weighed out. Today the proper amount is estimated to be fifty grams, so his amount was incorrect.

Of course, gentlemen, when a person has diabetes, that is obviously a different situation. The sugar illness, diabetes, shows that a person has lost his instinct for nutrition.

There you have the gist of the matter. If a child has a

tendency to worms, even the slightest tendency, he will do everything possible to prevent them. You'll be astonished sometimes to see such a child hunting for a garden where there are carrots growing, and then you'll find him there eating carrots. And if the garden is far off that doesn't matter, the child trudges off to it anyway and finds the carrots — because a child who has a tendency to worms longs for carrots.

And so, gentlemen, the most useful thing you can possibly do is this: observe a child when he is weaned, when he no longer has milk, observe what he begins to like to eat and not like to eat. The moment a child begins to take external nourishment, one can learn from him what one should give him. The moment one begins to urge him to eat what one thinks he should eat, at that moment his instinct is spoiled. One should give him the things for which he shows an instinctive liking. Naturally, if a fondness for something threatens to go too far, one has to dam it up — but then one must carefully observe what it is that one is damming up.

For instance, perhaps in your own opinion you are giving a child every nice thing, and yet the moment that child comes to the table he cannot help jumping up on his chair and leaning over the table to sneak a lump of sugar! That's something that must be regarded in the right way. For a child who jumps up on his chair to sneak a lump of sugar obviously has something the matter with his liver. Just the simple fact that

he must sneak a bit of sugar, is a sign that his liver is not in order. Only those children sneak sugar who have something wrong with their livers — it is then actually cured by the sugar. The others are not interested in sugar; they ignore it. Naturally, such a performance can't be allowed to become a habit; but one must have understanding for it. And one can understand it in two directions.

You see, if a child is watching all the time and thinking, when will Father or Mother not be looking, so that I can take that sugar: then later he will sneak other things. If you satisfy the child, if you give him what he needs, then he doesn't become a thief. It is of great importance from a moral point of view whether one observes such things or not. It is very important, gentlemen.

And so the question that was asked just now must be answered in this way: One should observe carefully what a child likes and what he loathes, and not force him to eat what he does not like. If it happens, for instance, as it does with very many children, that he doesn't want to eat meat, then the fact is that the child gets intestinal toxins from meat and wants to avoid them. His instinct is right. Any child who can sit at a table where everyone else is eating meat and can refuse it has certainly the tendency to develop intestinal toxins from meat. These things must be considered.

You can see that science must become more refined. Science must become much more refined! Today it is far too crude. With those scales, with everything that is carried on in the laboratories, one can't really pursue pure science.

With nutrition, which is the thing particularly interesting us at this moment, it is really so, that one must acquire a proper understanding for the way it relates to the spirit. When people inquire in that direction, I often offer two examples. Think, gentlemen, of a journalist: how he has to *think* so much — and so much of it isn't even necessary. The man must think a great deal, he must think so many logical thoughts; it is almost impossible for any human being to have so many logical thoughts. And so you find that the journalist — or any other person who writes for a profession — loves coffee, quite instinctively. He sits in the coffee shop and drinks one cup after another, and gnaws at his pen so that something will come out that he can write down. Gnawing at his pen doesn't help him, but the coffee does, so that one thought comes out of another, one thought joins on to another.

And then look at the diplomats. If one thought joins on to another, if one thought comes out of another, that's bad for them! When diplomats are logical, they're boring. They must be entertaining. In society people don't like to be wearied by logical reasoning — “in the first place — secondly — thirdly” — and if the first and second were not there, the third and

fourth would, of course, not have to be thought of! A journalist can't deal with anything but finance in a finance article. But if you're a diplomat you can be talking about night clubs at the same time that you're talking about the economy of country X, then you can comment on the cream-puffs of Lady So-and-So, then you can jump to the rich soil of the colonies, after that, where the best horses are being bred, and so on. With a diplomat one thought must leap over into another. So anyone who is obliged to be a charming conversationalist follows his instinct and drinks lots of tea.

Tea scatters thoughts; it lets one jump into them. Coffee brings one thought next to another. If you must leap from one thought to another, then you must drink tea. And one even calls them “diplomat teas”! — while there sits the journalist in the coffee shop, drinking one cup of coffee after another. You can see what an influence a particular food or drink can have on our whole thinking process. It is so, of course, not just with those two beverages, coffee and tea; one might say, those are extreme examples. But precisely from those examples I think you can see that one must consider these things seriously. It is very important, gentlemen.